Notebook, N-00-12-28

Storage
Battery
Tests

Dec 28 1900

No. I (A)

"Chloride" cell used in "Columbia" Auto-mobile.

Description of cell: See Drawing:

Calculated:

Vol of 3. Lead frames of positive pole: 3×2.88 = 8.64 cu in

3 ears 3×.373 = 1.12

Connecting pieces .80

10.56

Weight of dead lead 52lbs

= 2460 g.

Total weight of Pos. pole by weighing: - 4900 g

Weight of active material 2440 g

$\frac{2440}{4900} \cdot 100 =$ 44.8%

Negative pole:

Frame of two inner poles	1.4 oz
" " two outer poles 2 × 2.7	5.90
Two inner ears 2 × .373	.75
" outer ears 2 × .273	.55
Connecting piece	1.00
	10.20

Weight of dead lead = 5.1 lbs = 2300 g

Total weight of negat pole 3740

Weight of active 1440

or $\frac{1440}{3740} \cdot 100 = 38\%$ of Total

Weight of Parts of Cell

Positive Pole	10 lbs 13 oz =	4900 g
Negative Pole	8 " 4 oz =	3740 g
Liquid	1300 cc	1625 g
Rubber cell	1 lb 2¼ oz =	520 g
" cover		36 g
6 Corrugated Rubbersheets		52 g
Plug		4 g
Rubber rods		30 g
Pitch		102 g
		11009

11000 g = 24.2 lbs

Cell, as received from
the Auto' company
charged at 10 amps till
slight gasing.
The discharge-current
is kept constant
at 20 Amps.
The open Voltage is
read as soon as Weston
meter comes to rest
i.e is free from
pendulung.

	Ohms	~~Ohms~~
20.÷.055 =	.00275	
20÷.06	.003	~~.06575~~
20÷.08	.004	~~.09975~~
20÷.09	.0045	~~.01015~~
20÷.105	.05275	~~.06290~~
20÷.12	.006	~~.06890~~
20÷.11	.0055	~~.07440~~
20÷.13	.065	~~.13940~~
18÷.80	.0444	~~.18380~~
		~~Ohms~~

5/12 × 20 × 2.987 = 24.89
1/2 × 20 × 1.967 = 19.67
1/2 × 20 × 1.945 19.45
1/2 × 20 × 1.915 19.15
1/2 × 20 × 1.882 18.82
1/2 × 20 × 1.837 18.37
1/4 × 20.1 × 1.75 8.79
1/12 × 19 × 1.35 2.1375
121.2775 Volt Amp hrs

121.2775 Volt amp. hours

1st Discharge on Constant Current.

	Efficiency
1.975 ÷ 2.03	.9729
1.96 ÷ 2.02	.971
1.93 ÷ 2.01	.961
1.90 ÷ 1.99	.954
1.865 ÷ 1.97	.947
1.81 ÷ 1.93	.938
out	
1.81 ÷ 1.92	.942
1.69 ÷ 1.82	.929
1.00 ÷ 1.80	.556

Time.	Current	Closed E	Open EMF
3.20	20 Amp	2.00	
3.45	20	1.975	2.03
4.15	20	1.96	2.02
4.45	20 –	1.93	2.01
5.15	20 –	1.90	1.99
5.45	20 –	1.865	1.97
.15	20 –	1.81	1.93
6.30.	Out.		
7.55 am	22		2.02
8.00	20.2	187	192
8.15	20.	169	182
8.20.	18.	1	180

71.6 AH

Charging

9.30	10 Amp.	2.1 V.
10.30	10 –	2.17
11.45	10 –	2.20
1.00	10 –	
2.30	10 –	2.25
3.30	10 –	2.27
6.45	–	– 2.5

34.7 × 1/12 = 2.89
34.3 × 1/4 = 8.58 11.47
34 × 1/4 = 8.50 19.97
33.2 × 1/2 = 16.60 36.67
32.15 × 1/4 = 8.08 44.69
30.85 × 1/4 = 7.71 52.40
27.15 × 1/4 = 6.79 59.19 Cut.
20.05 × 1/4 = 5.01 64.20
15 × 1/4 = 3.75 67.95
12.75 × 1/4 = 3.19 71.14
11.4 × 1/4 = 2.85 73.99
10.0 × 1/3 = 3.35 77.32
8.85 × 1/6 = 1.48 78.80

2.89 × 1.95 = 5.64
8.58 × 1.94 16.64 22.28
8.50 1.92 16.1 38.38
16.60 1.875 31.6 69.98
8.62 1.815 14.88 84.86
7.71 1.74 14.12 98.98
6.79 1.52 10.42 109.40 105.40
5.01 1.125 5.64 voltamp hours
3.75 .8225 3.0825
3.19 .715 2.34
2.85 .6325 1.80
3.35 .555 1.89
~~124.1525~~ voltamp hrs

2nd Discharge on Constant Resistance

10 ÷ 34.4 = .002
12 ÷ 34.2 .0035
12 ÷ 33.8 .0035
14 ÷ 32.6 .0043
16 ÷ 31.7 .00505
20 ÷ 30.0 .00600
.45 ÷ 24.3 .0188

Ohms

2nd Discharge. Constant Resistance.

	Efficiency
1.95 ÷ 2.05	.952
1.93 ÷ 2.05	.943
1.97 ÷ 2.03	.942
1.84 ÷ 1.98	.929
1.79 ÷ 1.95	.917
1.69 ÷ 1.89	.895
1.35 ÷ 1.80	.751

2nd Discharge on constant resistance.

3.10	35 Amps	1.95	
3.15	34.4	1.95	2.05
3.30	34.2	1.93	2.05
3.45	33.8	1.91	2.03
4.15	32.6	1.84	1.98
4.30	31.7	1.79	1.95
4.45	30.0	1.69	1.89
5.00	24.3	1.35	1.80
5.15	16.4	.90	1.53
5.30	13.6	.755	1.20
5.45	11.9	.665	1.20
6.00	10.9	.60	1.18
6.20	9.1	.51	1.15
6.30	8.6	out	

On Charging 10 amp at 6.35 Out 8.25

49
465
955
4775

45 × 1 1/6

8/10	47.75 =	6.366 × 1.945 =	12.316
7/60	46.45 =	3.090 × 1.935	6.15
3/60	46.35 =	2.317 × 1.9275	4.565
1/12	46.10 =	3.841 × 1.92	7.465
1/12	45.75 =	3.812 × 1.91	7.39
1/12	45.45 =	3.787 × 1.8975	7.19
1/12	45.05 =	3.754 × 1.88	7.06
1/12	44.65 =	3.720 × 1.865	6.94
1/12	44.35 =	3.695 × 1.855	6.86
1/12	43.95 =	3.662 × 1.835	6.725
1/12	43.80 =	3.616 × 1.8125	6.55
1/12	42.80 =	3.566 × 1.79	6.38
1/12	42.0 =	3.500 × 1.7525	6.13
1/12	40.95 =	3.412 × 170	5.635
		52.134 Amp hrs.	97.350 Volt Amp Hours

3rd Discharge. Constant Resistance

	Efficiency
1.94 ÷ 2.09	.928
1.93 ÷ 2.08	.927
1.925 ÷ 2.07	.929
1.915 ÷ 2.07	.925
1.905 ÷ 2.05	.929
1.89 ÷ 2.04	.926
1.87 ÷ 2.03	.922
1.86 ÷ 2.02	.921
1.85 ÷ 2.01	.921
1.82 ÷ 1.99	.914
1.805 ÷ 2.00	.902
1.775 ÷ 1.93	.929
1.73 ÷ 1.84	.939
1.67 ÷ 1.80	.927

3rd discharge through Constant Resistance

5 ÷ 46.5 = .00322
5 ÷ 46.4 .00324
145 ÷ 46.3 .00313
155 ÷ 45.9 .00338
155 ÷ 45.6 .00340
15 ÷ 45.3 .00331
16 ÷ 44.8 .00357
16 ÷ 44.5 .00360
16 ÷ 44.2 .00362
17 ÷ 43.7 .00379
195 ÷ 43.1 .00452
155 ÷ 42.5 .00365
11 ÷ 41.5 .00265
13 ÷ 40.4 .00324

Ohms.

3rd Discharge through constant resistance

11.00	49. Amps	1.95	open
11.05	46.5	1.94	2.09
11.12	46.4	1.93	2.08
11.15	46.3	1.925	2.07
11.20	45.9	1.915	2.07
11.25	45.6	1.905	2.05
11.30	45.3	1.89	2.04
11.35	44.8	1.87	2.03
11.40	44.5	1.86	2.02
11.45	44.2	1.85	2.01
11.50	43.7	1.82	1.99
11.55	43.1	1.805	2.00
12.00	42.5	1.775	1.93
12.0[illegible]	41.5	1.73	1.84
12.[illegible]	40.4	1.67	1.80
~~12.[illegible]~~			
141	~~46~~		
143	42.8	1.76	1.94
150	38.3	1.79	1.89
158	31.2	1.07	1.80
2.[illegible]	22.0	.90	1.40

[ITEM FOUND IN BOOK]

22 Cells 16 plates ¼ inch thick ⅛ apart.

4X8 in size plates —

Little plates 2.81 sq. inches 5/32 thick
holds 15 grams metallic Hg w/ 3. grams
metallic iron in other plate —

2.25
1.25
1125
450
225

2.8125

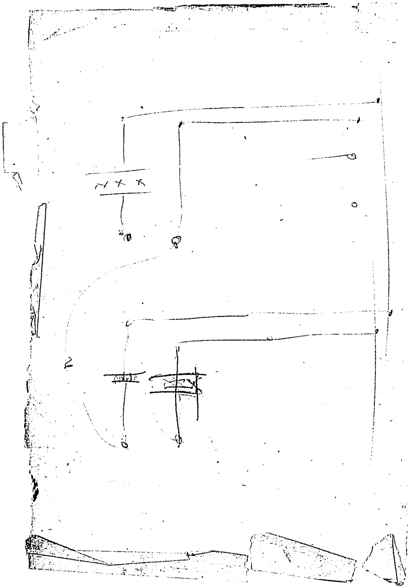
[ITEM FOUND IN BOOK]

Ni II and Fe: III

- Open 1475

	Current	Closed	Open
9.15	6.3	1.25	
9.16	6.12	1.22	
9.17	5.90	1.16	1.28
9.20	4.35	.84	1.24
9.25	3.68	.715	1.18
9.30	3.40	.65	1.15
9.35	3.1	.60	1.10
9.40	3.05	.58	1.10
9.45	2.9	.56	1.10
9.50	2.85	.54	1.08
9.55	2.75	.53	1.08
10.00	2.70	.51	1.08
10.05	2.60	.50	1.06
10.10	2.55	.49	1.06
10.25	2.4	.46	1.04
10.40			

171
355

[ITEM FOUND IN BOOK]